

Application No. 10/054,331
Docket No. A4-1763
Amendment dated May 17, 2004
Reply to Office Action of December 17, 2003

Amendments to the Specification:

Please replace the title of the invention at page 1 with the following amended title:

~~MEMS CAPACITIVE SENSOR~~ IMPLANTABLE SENSING
DEVICE FOR PHYSIOLOGIC PARAMETER
MEASUREMENT

Please replace paragraph [0009] with the following amended paragraph:

[0009] Also an object of this invention is to a microfabricated
~~microfabricated~~ sensing device adapted for implantation within the body of
patient in which active circuitry is integrated into the sensing device.

Please replace paragraph [0010] with the following amended paragraph:

[0010] A further object of the invention is to provide a microfabricated
implantable sensing device ~~capacitive pressure sensor~~ exhibiting high
stability and low drift.

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Please delete [0011].

Please replace paragraph [0012] with the following amended paragraph:

[0012] In overcoming the limitations of the prior art and achieving the above objects, the present invention provides for a ~~MEMS~~ sensing device for implantation into the body of a patient and which permits conditioning and analysis of the signal from a ~~capacitive~~ sensor portion of the device on the device itself.

Please replace paragraph [0013] with the following amended paragraph:

[0013] In achieving the above, the present invention provides a ~~MEMS~~ sensing device in which the sensing and signal conditioning components are located on a monolithic structure that can be entirely implanted in the human body. The monolithic structure ~~the same chip. The implanted device~~ includes a substrate on which a sensor is integrally microfabricated and configured to be responsive to a physiologic parameter of a patient's body. For example, the sensor may be a capacitive sensor adapted to measure pressure, e.g., blood pressure. ~~is formed a capacitive~~

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~~sensor. The fixed electrode of the capacitive sensor may formed on the substrate itself, while the moveable electrode of the capacitive sensor is formed as part of a highly doped silicon layer on top of the substrate. Being highly doped, the silicon layer itself operates as the conductive path for the moveable electrode. A separate conductive path is provided on the substrate for the fixed electrode.~~

Please replace paragraph [0014] with the following amended paragraph:

[0014] In addition to the ~~capacitive~~ sensor, the monolithic structure of the implantable ~~the implanted~~ sensing device includes active circuitry that conditions the signal from the sensor for immediate signal processing, for example, data ~~capacitive sensor and which immediately begins processing of the data, including~~ logging, error correction, encoding, analysis and/or multiplexing of multiple sensor inputs. As such, the active circuitry may be integrally microfabricated in the substrate ~~a highly doped silicon layer~~ during microfabrication of the sensor and employing the same fabrication techniques. Alternatively, the active circuitry may be added ~~may added~~ to the substrate of the device after initial microfabrication of the sensor ~~sensor itself~~ and thereafter connected to the sensor through wirebonds or leads

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integrally fabricated with the sensor.

Please replace paragraph [0015] with the following amended paragraph:

[0015] Locating this circuitry on the monolithic structure in close proximity ~~as near as possible~~ to the microfabricated sensor minimizes parasitic effects and other factors that could lead to degradation in the received signal and error in the measured physiologic parameter. Further objects ~~object~~ and advantages of the present invention will become apparent to those skilled in the art from a review of the drawings in connection with the following description and dependent claims.

Please replace paragraph [0029] with the following amended paragraph:

[0029] FIG. 13B is an embodiment generally similar to that seen in FIG. 13A ~~FIG. 23~~ for sensing according to the principles of the present invention;

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Please replace paragraph [0057] with the following amended paragraph:

[0057] FIG. 13A illustrates a sensing device 512 having an alternative capacitive pressure sensor 518 ~~sensor 556~~ on a substrate 520, additional structures are omitted for clarity. In this sensor 518, ~~sensor 556~~, the capacitance changes due to a varying dielectric constant within the capacitive gap defined between electrodes 558 and 560, ~~158 and 160~~. The gap is filled with sensing substance 562 chosen such that its dielectric constant changes in response to the particular physiologic stimulus being evaluated. FIG. 13B depicts an alternate implementation of the above embodiment, with the electrodes 558' and 560' and the sensing substance 562' ~~substance 562~~ being stacked vertically on the substrate 520, as opposed to the lateral orientation in FIG. 13A.